

**ARTERIAL LINE - ICU**

- PURPOSE:** To outline the management of the patient with an arterial line.
- SUPPORTIVE DATA:** Arterial lines (A-lines) are used for invasive arterial blood pressure monitoring or frequent blood sampling. A-lines are not to be used to administer medications (except for umbilical arterial lines [UAL] in the NICU).
- The use of heparin in the flush system requires a provider's order.  
Note: Heparin is not routinely utilized.
- ASSESSMENT:**
1. Monitor arterial pressure and waveform continuously.
  2. Obtain A-line pressure within 1 hour of assuming care and a minimum of every 2 hours in stable patients and more frequently if unstable.
  3. Assess the following every 2 hours (every hour Peds, NICU):
    - Waveform
    - Skin color of the extremity distal to the catheter site
    - Site
      - Signs of infection (warmth/redness/swelling)
      - Dressing dry and intact (tape bridge for UAL in NICU)
      - Hematoma/excessive bleeding/leaking
  4. Assess the circulatory status of the extremity distal to the catheter site a minimum of every 4 hours (every hour in the NICU/PICU) for the following:
    - Skin temperature
    - Capillary refill and collateral/distal pulses
    - Sensation and movement
    - Edema
  5. Level and zero transducer to phlebostatic axis (located at fourth intercostal space at the mid-anterior-posterior diameter of chest wall):
    - Upon assuming care and a minimum of every 12 hours
    - With every change in position (re-level only)
    - To verify accuracy of any questionable values
  6. Perform square wave test (not done in NICU):
    - After line zeroed
    - Upon assuming care
    - A minimum of every 12 hours
    - With any questionable values
  7. Release pressure from pressure bag and assess type and amount of fluid in flush bag at the beginning of the shift.
  8. Assess for signs of infection with every dressing change.
- MAINTENANCE**
9. Maintain pressure bag at 300 mmHg (NICU uses the syringe pump with GuardRails™ [smart pump capability]).
  10. Ensure normal saline flush bag has sufficient amount to maintain a good waveform and perform a square wave test. NICU: Use heparin 0.5 units/mL normal saline as ordered.
  11. Change as follows:
    - Flush solution every 96 hours (4 days), with catheter change, and as necessary (NICU every 24 hours)
    - Pressure tubing and transducer every 96 hours (4 days) and with catheter change (NICU every 24 hours)
    - Dressing (Adults/Peds)
      - Use chlorhexidine gluconate (CHG) infused dressing such as Biopatch™
      - Gauze (if placed) change every 24 hours and PRN
      - Transparent dressing every 7 days

- PRN damp, loosened, or visibly soiled
- Clean site with Chloraprep™ during dressing change (use povidone-iodine if Chloraprep™ is contraindicated, e.g. patient is allergic)
  - Dressing (NICU)
    - PRN damp, loosened, or visibly soiled
    - Infants < or equal to 28 weeks gestation, use Povidone-Iodine swabsticks then wipe with normal saline wipes
    - Infants > 28 weeks gestation, use chlorhexidine then wipe with normal saline wipes

12. Use Normal Saline for flush solution. (Use appropriate pressure bags for 500mL or 1000mL NS volumes except NICU).
13. Scrub blood access port with Chloraprep™ (scrub 15-30 seconds, allow to dry 15 seconds) prior to blood withdrawal.

**SAFETY:**

14. Verify the following:
  - Alarms are on and parameters set
  - Catheter and tubing connections are secure
  - All ports are covered with non-vented caps
15. Stabilize site with armboard as needed (careful not to tape to create a tourniquet effect)
16. Maintain flush at all times
  - **DO NOT** cap/heplock arterial line, even for transport
17. Do not place blood pressure cuff on extremity with arterial line.

**BLOOD WITHDRAWAL**

18. Aspirate appropriate blood volume for specimen requested (see attached for pediatrics/NICU)
  - Use adult in-line reservoir system for patients over 14 years old and greater than 40 kg. Do not use for smaller and younger patients.
19. Reinject all blood and solution aspirated to clear line:
  - PICU
  - NICU (UAL only)
  - Units using closed, in-line reservoir system
20. Flush system after all blood withdrawal to clear line.

**ARTERIAL LINE REMOVAL**

21. Apply firm, manual pressure to site a minimum of 5 minutes (10 minutes for anticoagulated patients) or until hemostasis is obtained upon removal arterial line (as ordered).
22. Apply pressure dressing to site and re-evaluate site within 2 hours.
23. Assess for change in pulse quality, skin color, and temperature, immediately following removal of A-line and a minimum of every 4 hours.

**REPORTABLE CONDITIONS**

24. Notify the provider for:
  - Non-functional A-line (e.g. inability to draw blood, inability to obtain appropriate waveform)
  - Diminished/loss of collateral/distal pulse of cannulated extremity
  - Cool skin/ skin color change (e.g. mottling)/ decreased capillary refill to cannulated extremity
  - Edema
  - Hematoma/excessive bleeding/leaking at site
  - Signs of infection

**PATIENT/ CAREGIVER EDUCATION**

25. Explain purpose of A-line and need for frequent monitoring
26. Inform nurse; for bleeding at site, complaint of pain

**ADDITIONAL STANDARDS:**

27. Refer to the Restraints Standard as needed.

**DOCUMENTATION:**

28. Document in accordance with documentation standards.
29. Document in Orchid; iView, Lines & Devices Navigator Band and a dynamic group – label accordingly

Initial date approved: 1996	Reviewed and approved by: Professional Practice Committee Critical Care Committee Nurse Executive Committee Attending Staff Association Executive Committee	Revision Date: 96, 97, 00, 02, 08/03, 03/05;07/06, 04/12, 04/15, 11/18, 4/22
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**Blood Specimens for Pediatric Tests  
(Reinject all blood aspirated for clearing line)**

<b>Laboratory Test</b>	<b>Container</b>	<b>Required Blood Volume</b>	<b>Special Instructions</b>
Arterial/Venous Blood Gas	Blood gas sampler kit	0.3 mL (minimum) – must choose between Blood Gas & Chem or CoOx (indicate priority) 0.5 mL – Full Panel	
Blood Cultures	Aerobic culture (Pink Peds BD Bactec bottle)  Isolator Pediatric Tube for Mycology and/or Mycobacteriology	1 mL/bottle (max – 3 mL/bottle)  1 mL (min and max)	
CBC	Lavender capped microtainer tube	1 microtainer filled up to 500 line	500 line = 0.5 mL Perform 8 tube inversions
Chemistry Panel/ PICU Panel	Yellow capped microtainer with gel	2 microtainers filled up to the 600 line	600 line = 0.6 mL Perform 5 tube inversions
Drug Levels	Yellow capped microtainer with gel	1 microtainer filled up to the 600 line	Perform 5 tube inversions
PT/PTT or coagulation	Pediatric Blue capped Tubes: (Sarstedt coag microtubes) Fill 1.3mL, 1.8mL, or 2.7mL  NICU: Sarstedt 1.3mL sodium citrated tubes	Full tube  Full tube	Per Utilize “dummy” tube first to assure tube fills completely Perform 5x tube inversions
STAT Lytes	Yellow capped microtainer with gel	1 microtainer filled up to the 600 line	Yellow capped microtainer with gel
Type and Cross	Pediatric – Pink capped tube Neonates – pink or lavender capped microtainer	3 to 4 mL 1 microtainer filled up to the 500 line	